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# Artificial Incubation of Chickens

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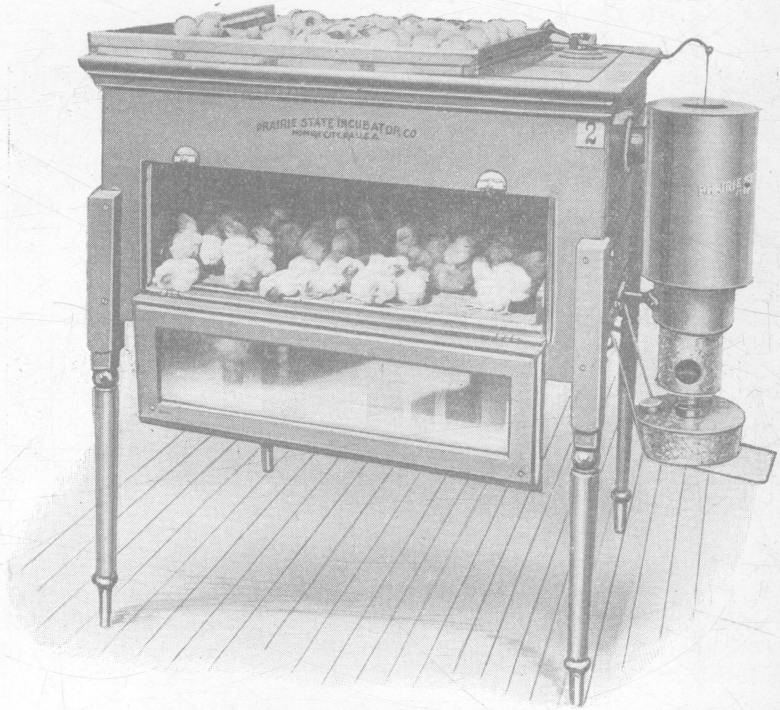


The proof of a good hatch—many fluffy chicks and few unhatched eggs

The Ohio State University, Cooperating with the United States Department of Agriculture, Agricultural College Extension Service, H. C. Ramsower, Director, Columbus, Ohio.
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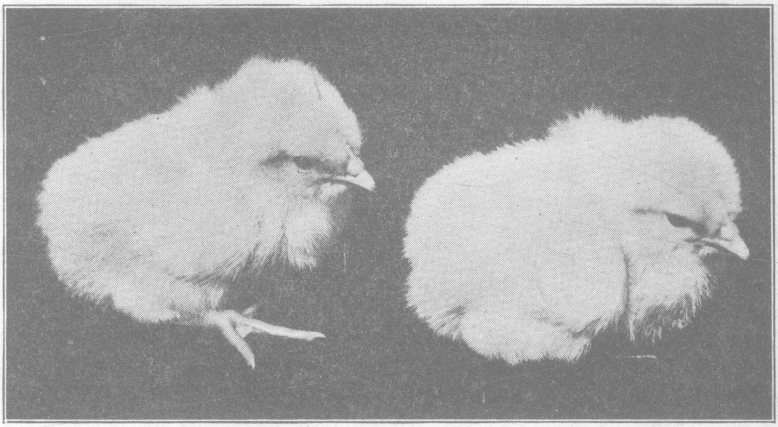
# Artificial Incubation of Chickens

By F. S. Jacoby

Artificial incubation is regarded as necessary for the farmer who desires to hatch and rear one hundred or more chicks per year. The incubator has become as common as the cream separator, and it bears a relation to the poultry flock similar to that of the separator to the dairy herd. It is a labor saving device. In addition, the incubator has other advantages that make it an economically sound investment. First, it enables the farmer to hatch his eggs at any month in the year. Second, on a 100-egg basis, the incubator is more economical than a group of setting hens. Third, the incubator does the hatching while the hens continue production, thereby yielding a larger profit per hen per year. To remove a hen from the flock in the spring season curtails the



These chicks are the result of proper ventilation

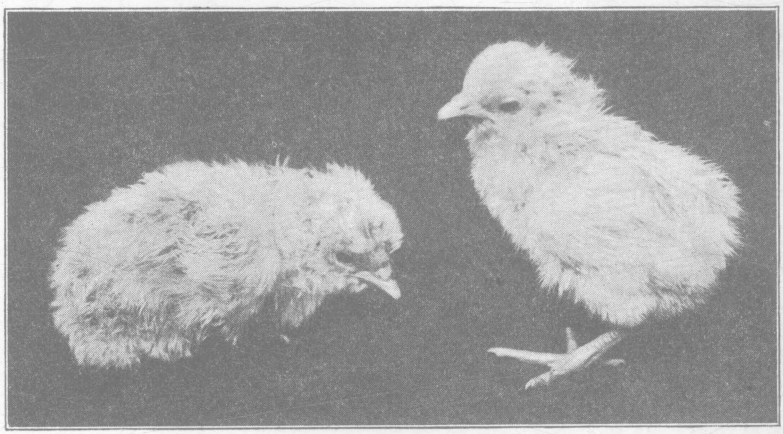
profits at the time the profits are greatest. Fourth, chicks hatched in incubators may be cared for in larger groups in brooders with less expense and labor than under hens. Fifth, incubator chicks are free from lice and mites. Sixth, experience has shown that incubator chicks are as vigorous and healthy as hen-hatched chicks.

Certain factors relative to the operation of incubators are of primary importance. These are: (1) location, (2) temperature, (3) ventilation and moisture, and (4) turning and airing the eggs.

**Location.**—The location of the incubator may have a decided influence upon the number of chicks hatched. Heretofore the usual recommendation has been to locate the incubator in a cellar that maintains a more or less uniform temperature. With the improvement of the mechanical parts of the incubator, this reason for location is not so important as it used to be. The important point is pure air. The room, whether a cellar or not, should be so arranged that both the heavy gases near the floor and the light odors near the ceiling have a means of being dispelled. If the air in the room is impure, the air in the incubator will be even more so. The uniformity of temperature in a cellar is a decided help in the operation of the incubator, but it is better to have a

room with a variable temperature if the air is purer thereby. The most satisfactory results are obtained in a room having a cement or dirt floor, with a temperature of 60° to 70° F.

**Temperature.**—The normal incubation temperature of hen eggs is 103° F. The position of the thermometer will determine the temperature at which the incubator should be operated. The thermometer may be arranged so that the bulb is in contact with the eggs, or it may be hung above the eggs so that the bulb does not touch the top of the eggs. These two methods would each require a different reading to produce the correct temperature of the contents of the egg. When the bulb of the thermometer is in contact with one or two eggs and is on a level with the upper one-fourth of the egg, the temperature should be 102° the first week, 103° the second week, and 104° the third week. If the thermometer is hung so that the bottom of the bulb rests on the top of the egg, the readings should be 103° the first week, 104° the second week, 104½° the third week until the eighteenth day, after which 105°



Lack of ventilation produces chicks like these

will be safe for the balance of the hatch. With the thermometer suspended just above the eggs so that the tray can be removed without striking the thermometer, the temperature should be 103° the first week, 104° the second week, and 105° the third week.

The incubator thermometer should be tested at the beginning of each season by comparing the readings with those of a certified standard thermometer in warm water at 102°, 103°, 104°, and 105° F. and careful note made of all variations.

**Moisture and Ventilation.**—Moisture and ventilation in the incubator are so closely associated that they cannot be considered separately. Nearly all incubators have some provision for supplying moisture during incubation. The use of moisture permits greater ventilation during incubation without excessive evaporation of the egg contents. The amount of ventilation will have a decided influence upon the quality and number of chicks hatched. The greatest amount of oxygen is needed from the seventh to the twentieth days of incubation. The air in the incubator should always smell sweet. If it has any preceptible odor there is not sufficient ventilation, and the eggs will not hatch as they should. The safest method of supplying moisture is by means of moisture pans located

under the egg trays. The question of ventilation is automatically cared for in most incubators. Openings in the bottom, sides, or top permit fresh air to enter and impure air to pass out. If there are openings in the top of the machine, much more moisture must be supplied in the egg chamber, for there will be considerable moisture carried out of the machine with the warm air. If there are no openings in the top of the incubator the moisture in the eggs will be conserved, but in order to supply sufficient oxygen to the developing embryos there must be a system of ventilation that will circulate the air inside the incubator so that the light odors as well as the heavy gases are dispelled and are replaced with a certain amount of fresh air. As a rule the amount of ventilation should be increased as the hatch progresses. Late hatches require more ventilation than the earlier hatches. The best guide as to the moisture requirement is the egg itself. About two-thirds of the egg content should be occupied by the embryo on the nineteenth day. If too much moisture is supplied and too little ventilation allowed, the chicks will hatch with considerable irregularity and will not dry off with a soft, smooth down. If proper ventilation and moisture conditions have prevailed the chicks will hatch out with uniformity, with a clean, soft down.

**Turning and Airing the Eggs.**—Turning and airing the eggs is necessary for the production of strong, vigorous chicks. The hen on the nest turns the eggs with her feet several times a day. Turning insures an even development of the embryo and prevents any parts from adhering to the inside of the shell. The necessity for turning is apparent from the third to the eighteenth days of incubation, but in those incubators that have automatic turning devices which permit the eggs to be turned without opening the machine, it may be desirable to turn the eggs from the second to the nineteenth days. There is no advantage in extending the time, if the machine must be opened and the egg tray removed in order to turn the eggs. Airing the eggs is a better expression than cooling, because it expresses more concisely the real value that accompanies cooling. It is the fresh oxygen that the eggs draw in as they cool that has a strengthening effect upon the embryo. The usual period for airing is from the fifth to the eighteenth days. The eggs should be turned three times a day—morning, noon, and afternoon. They should be aired once a day, preferably at noon. The length of the airing period will depend upon the development of the embryo and the temperature of the room in which the eggs are aired. It will vary from two or three minutes for eggs five days incubated early in the season, to forty-five minutes for eighteen-day eggs in the late spring or early summer. Turning by hand is undoubtedly more nearly perfect than any automatic egg turning device, and if done once a day in addition to the other turnings there will be a marked decrease in the number of crippled chicks.

**Care of Incubator After the Hatch.**—Remove all shells and unhatched eggs at the end of the twenty-second day. Chicks hatched after the twenty-second day will be too weak to prove worth raising.

The incubator should be thoroly cleaned and disinfected after each hatch. Certain communicable diseases may be transmitted to the chicks thru the medium of bits of egg shell and droppings, unless the trays are kept in a sanitary condition. Remove the trays and all portable parts from the interior of the machine. Scrub these as well as the inside of the machine with hot soapy water. Then drain and disinfect everything with a two percent solution of creolin or zenoleum. Replace the trays, close the door of the incubator, light the lamp and let the machine dry out. The fumes from the disinfectant will penetrate to all parts of the machine. If burlap is used on the nursery tray, use a clean burlap for each hatch.